The Claims as Pending

1. (previously presented) A method for producing polyhydroxyalkanoates comprising providing organisms selected from the group consisting of bacteria, plants, and yeast, which express enzymes selected from the group consisting of acyl-CoA transferase, acyl-CoA synthetase, β-ketothiolase, acetoacetyl-CoA reductase, and PHA synthase, wherein the organisms are genetically engineered to express polynucleotides that encode enzymes, which are active in bacteria or plants, selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, wherein the enzymes expressed by the organisms can convert diols into hydroxyalkanoate monomers selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate, and culturing the organisms under conditions wherein the hydroxyalkanoate monomers are polymerized by the activity of a PHA synthase enzyme to form polyhydroxyalkanoates having a weight-average molecular weight (Mw) of at least 300,000 Da.

2. (original) The method of claim 1 wherein the diol is 1,6-hexanediol and the hydroxyalkanoate monomer is 6-hydroxyhexanoate.

3. (original) The method of claim 1 wherein the diol is 1,5-pentanediol and the hydroxyalkanoate monomer is 5-hydroxyvalerate.

4. (previously presented) The method of claim 1 wherein the diol is 1,4-butanediol and the hydroxyalkanoate monomer is 4-hydroxybutyrate.

5. (cancelled)

6. (previously presented) The method of claim 1 wherein the diol is 1,2-ethanediol and the hydroxyalkanoate monomer is 2-hydroxyethanoate.

7. (previously presented) The method of claim 1 wherein the diol is 1,2-propanediol and the hydroxyalkanoate monomer is 2-hydroxypropionate.

8. (previously presented) The method of claim 1 wherein the organism expresses polynucleotides which encode aldehyde dehydrogenase and diol oxidoreductase.

9. (previously presented) The method of claim 8 wherein the organism is selected from the group consisting of *Escherichia coli*, *Ralstonia eutropha*, *Klebsiella* spp., *Alcaligenes latus*, *Azotobacter* spp., and *Comamonas* spp.

10. (previously presented) A system for making polyhydroxyalkanoates comprising organisms selected from the group consisting of bacteria, plants, and yeast , which express enzymes selected from the group consisting of acyl-CoA transferase, acyl-CoA synthetase, β-ketothiolase, acetoacetyl-CoA reductase, and PHA synthase, wherein the organism is genetically engineered to express polynucleotides that encode enzymes, which are active in bacteria or plants, selected from the group consisting of diol oxidoreductase and aldehyde dehydrogenase, wherein the enzymes expressed by the organisms can convert diols into hydroxyalkanoate monomers selected from the group consisting of 4-hydroxybutyrate, 2-hydroxybutyrate, 4-hydroxyvalerate, 5-hydroxyvalerate, 6-hydroxyhexanoate, 2-hydroxyethanoate, 2-hydroxypropionate, and 3-hydroxyhexanoate, wherein the monomers are polymerized by the

activity of a PHA synthase enzyme to form polyhydroxyalkanoates having a weight-average molecular weight (Mw) of at least 300,000 Da.

Claims 11-23. (cancelled).